

# THE MINERAL INDUSTRY OF

# FRANCE

By Harold R. Newman

France was a major European mineral producer. The traditional mineral industries have been in a state of transition during the past few years. In the past, the heavy economic and political involvement of the state was one of the main elements of the national mineral policy. The reduction of Government subsidies supporting uneconomic mineral operations and the depletion of mineral reserves have had significant impact on a number of extractive operations in the mineral industry. Efforts have been made to promote the private sector and to reduce the dependence of state-owned companies on subsidies.

The Government proceeded with a program of privatization involving large state-controlled companies to reduce the direct role of the Government in the economy. Included among nine major companies privatized since 1994 were the Pechiney Group, Rhône-Poulenc S.A., Société Nationale Elf Aquitaine, and the Usinor Group. In an effort to encourage exploration within the country, the French mining code was modified in July 1995 by a law that established clearer expedited rules to allocate surveying and mining licenses.

Mineral and metal industries generally maintained production and other activities at about the same or slightly decreased rates as that of 1997. Several industries, such as bauxite, coal, iron ore, and uranium, have steadily undergone changes during the past few years, especially bauxite, which was no longer mined. There was some reprocessing of bauxite waste dumps; the product was used by cement companies.

The coal and iron ore industries, as well as other mineral producers, were affected by cheaper foreign sources, high operating costs, and the depletion of domestic resources. Coal mining was directed by Charbonnages de France (CdF), a state-owned company.

The uranium industry reduced its operations by closing a number of mines and processing plants owing to low market prices and depletion of certain deposits. Some factors in the drop of uranium demand were the reduced cost for petroleum and the increased accessibility of natural gas from the North Sea and the former Soviet Union. (See table 1.)

The Government maintained efforts to refocus the country's trading patterns toward the countries of the Organization for Economic Cooperation and Development. Strong commercial relations continued between France and the United States, and Germany remained France's largest export destination. In 1998, France was the 10th largest trading partner of the United States worldwide and the 3d largest trading partner in Europe, after the United Kingdom and Germany (Bureau of Economic and Business Affairs, 1998).

Government and private companies produced minerals and mineral products, conducted research, and explored for new domestic and international mineral resources. (See table 2.)

The Franco-Australian partnership LaSource Compagnie Minière was formally dissolved after nearly 4 years. Bureau de Recherches Géologiques et Minières (BRGM) sold its 35% interest in LaSource to Normandy Mining Ltd. of Australia, owner of the balance, for about \$22 million. The termination was to be finalized by March 1999. LaSource was formed to use BRGM's experience in the exploration and Normandy's experience in the development of mineral resources. Normandy was proceeding with exploration and development of the Chessy copper deposit near Lyon (Metal Bulletin, 1998).

Gold mining in France was mostly concentrated in Société des Mines du Bourneix's open pit and underground operations south of Limoges in the Saint Yrieix la Perche District and Mines d'Or de Salsigne's underground Salsigne Mine near Carcassonne. Each company produced about 2 metric tons per year (t/yr) of gold.

The iron ore basin of northern France stretches from Lorraine northward into Belgium. For many years, the high phosphorus and low iron content of the ore limited its desirability, and production has been declining for several years. Terres Rouges Mine, the last iron ore mine in the Lorraine district, was closed in 1998. The mine belonged to Acieries Reunies de Burbach-Eich-Dudelang (ARBED) S.A. of Luxembourg. ARBED switched from blast furnace production to electric arc furnace production, and no longer needed the iron ore from Terres Rouges. The mines of Lorraine once produced more than 50 million tons per year (Mt/yr) of iron ore that was primarily exported to Belgium, Germany, and Luxembourg (Mining Journal, 1998).

Usinor ranked fourth in the world as a producer of steel in terms of crude steel production and second in terms of sales from steelmaking activities, after Nippon Steel of Japan. The company's principal activities are divided into flat carbon steels, stainless steels and alloy, and specialty steels. It announced that it had completed the acquisition of J&L Specialty Steel Inc., a leading manufacturer of flat rolled stainless steel. J&L was headquartered in Pittsburgh, Pennsylvania, with plants located in Midland, Pennsylvania; Louisville, Ohio; and Detroit, Michigan (Usinor Group, December 18, 1998, Usinor completes acquisition of J&L Specialty Steel, press release, accessed March 29, 1999, via URL <http://www.usinor.com/ENGLISH/INDEX.HTM>).

Usinor and the Walloon region, Belgium, initiated an agreement that would permit Usinor to become the majority shareholder in the Belgium steel producer Cockerill Sambre. Usinor will purchase 53.77% of the capital of Cockerill Sambre for about \$650 million. The new group should create industrial and marketing synergies for flat carbon steel in the automobile, appliances, building, and distribution sectors as Cockerill Sambre has a strong position in the latter two sectors (Usinor,

October 15, 1998, Plans for Usinor to acquire a majority interest in Cockerill Sambre, press release, accessed March 29, 1999, via URL <http://www.usinor.com/ENGLISH/INDEX.HTM>.

Mining of lead and zinc completely ceased in France. In 1998 two companies operated primary zinc plants using imported ores and concentrates. Société des Mines et Fonderies de Zinc de la Vieille Montagne of Belgium operated a zinc refinery at Aubyles-Douai with a capacity of 210,000 t/yr of zinc. Métaeurop Nord S.A. operated a 110,000-t/yr primary smelter and a 40,000-t/yr secondary smelter at Noyelles-Godault.

Compagnie Générale des Matières Nucléaires, the state-owned uranium mining company, was the major producer of uranium in France. In recent years, however, the pace of exploration has decreased, and projected future ore requirements have leveled off. Most projects worldwide have been halted or canceled, and several mines in France were closed.

Denain-Anzin Minéraux Refractaire Ceramique (DAMREC), a subsidiary of the Imetal Group, was the only producer of andalusite in Europe. DAMREC's mining operation was at Glomel, Brittany, and produced about 75,000 t/yr sold mainly to the refractory and ceramic industries.

The primary barite mining area was at Chaillac near Limoges. Barytine de Chaillac, a subsidiary of Solvay Barium Strontium GmbH of Germany, was the major producer with an open pit mine and a plant at Chaillac. Barytine produced about 70,000 t/yr of flotation-grade barite, averaging 98% barium sulfate, suitable for chemicals production.

LaFarge SA and Société des Ciments Français were the two largest producers of cement in France. During the past several years, these two companies have been acquiring a number of companies domestically, as well as internationally. Each company has gained control of approximately one-third of the domestic market—LaFarge (13 plants with a total capacity of 10 Mt/yr and Ciments Français (9 plants with a total capacity of 7 Mt/yr)—leaving fewer than 8 other companies holding the remaining one-third (International Cement Review, 1998).

Société Générale de Recherches et d'Exploitation Minières (SOGEREM) was the main producer of fluorspar with three open pit mines in the south of France accounting for more than 60% of fluorspar production. The fluorspar vein deposits were found in the Hercynian massifs, the Massif Central, the Vosges, the axial zone of the Pyrénées, and the outer Alps. SOGEREM's mining operations supplied Comifluor S.A., which operated a plant at Bastide-a-Olette that produced acid-grade fluorspar, 97% calcium fluoride, and electrical-grade fluorspar. The Escardo Mine, owned by Denain-Anzin Minéraux S.A., also shipped about 90,000 t/yr of crude ore from its surface mining operation to the Olette plant for processing, resulting in total production of about 45,000 t/yr of both grades (Marketing Department, GMH, 1998).

SOGEREM also exported an estimated 15,000 metric tons of fluorspar to a Tunisian aluminum fluoride operation (Huxtable, 1998).

France was one of Europe's largest producers of gypsum. Two-thirds of the production was from the Paris Basin. Four companies produced about 95% of the output. S.A. de Matériel de Construction, the largest company, accounted for almost one-half of the total gypsum produced.

Kaolin deposits derived from the granite massifs in Brittany were the most actively mined deposits in France. The largest

mine, operated by La Source Compagnie Minière, was in the Kaolin d'Arvor deposit near Quessoy. The mine had a capacity of 300,000 t/yr. The second largest operation was Société Minière des Kaolin Du Moribihan's (SMKDM) open pit mines at Lanvrian and Kerbriant with production of 80,000 t/yr of kaolin and 10,000 t/yr of mica. The third largest operation was Société des Kaolins du Finistère's (SKF) 30,000-t/yr operation at Berrien. SMKDM and SKF were owned by Groupe Minéral Harwanne (Marketing Department, 1998).

The kaolin was used mostly in the paper and the ceramic industries. Ball and refractory clays were mined in the Charante Basin to the southwest, which has produced more than 1 million metric tons to date.

Mines de Potasse d'Alsace S.A. (MDPA) was the principal producer of potash with two underground mines, Marie-Louise and Amélie, located near Mulhouse, Alsace. MDPA was the world's fifth largest supplier of potash salts. The main products were potash ore, which was concentrated to 62% potassium oxide material, bromine, rock salt for snow clearing, and other industrial products. About 90% of the potash production was used by the agriculture industry for fertilizer, and 10% was purified and treated for use in other industries. MDPA was expecting reserves to be exhausted in 2004, and in anticipation of closure, production was slowly being phased out (Industrial Minerals, 1998).

Talcs de Luzenac S.A. was significant not only to the domestic market, but also to the European market. The company had acquired several talc mining interests worldwide. Borax Français S.A., a subsidiary of Rio Tinto Corp., subsequently purchased 92% of Talc de Luzenac. As a result of mergers and acquisitions during the past 6 years, the Luzenac Group was formed as a subsidiary of Rio Tinto. Luzenac operated 16 deposits and 20 processing plants in Europe and North America and was the leading talc producer in the world.

All underground coal mines were closed in the Midi-Pyrénées region and in the Nord Pas-de-Calais Basin. CdF was proceeding with further rationalizations, resulting in reduced production. The rest of the mines, except in Lorraine region, were expected to close between 1997 and 2000. The mines in Lorraine were expected to close after 2000. CdF envisioned the final stoppage of all coal mining in France by 2005 (Mining Journal, 1998).

In 1998, onshore petroleum production was mainly from the Paris and the Aquitaine Basins. Because production had started to decline in these areas, the Government was planning to initiate a program to encourage exploration for new deposits in other areas thought to have potential; the Jura Basin was one area under consideration.

Elf Aquitaine—France was to form a strategic alliance with Yuksi of Russia by paying \$528 million for a 5% stake in the largest private sector oil company in the world in terms of proven reserves. Elf and Yuksi will study ways of cooperating to develop western Siberia's Prirazlom oilfield with reserves estimated to be 1 billion barrels. The two groups will also carry out an evaluation of the Yurubcheno-Tokhomo field in eastern Siberia. Cooperation will include crude oil trading and distribution of petroleum products in the Yuksi network (Davies and Owen, 1998).

Companies operating refineries in France included Elf Aquitaine, Total, Royal Dutch/Shell Group, British Petroleum Co. Plc., Mobil Corp., and other smaller companies. The

structure of the industry was geared to gasoline production. Refining was mainly focused on the high-octane unleaded gasoline used by a majority of the vehicles in France.

No refining units have been capable of processing heavy fuels, nor were there any hydrocracked feedstocks available for the production of gas oil, thus leaving the process stream short on middle distillates and naphtha. France was a net importer of petroleum products.

One of the most significant infrastructure developments in recent years has been the Channel Tunnel Project. The tunnel, constructed underneath the English Channel, connected Coquelles, near Calais, France, and Folkestone, England. Transportation, not only in France, but also in the whole of Europe, has changed significantly from the operation of the Channel Tunnel. From these terminals, people drive their vehicles onto trains transporting them 49 kilometers to the other side in about one-half hour. Trains are also used to transport freight. The Channel Tunnel connecting the two countries is a vital infrastructure component within the European Union (EU).

Having one of the world's most developed economies, France was an advocate for the EU and the European single-market concept. The country has had to make considerable changes in the structure of its industries, particularly those mineral industries controlled by the state. Several state-owned companies have taken the initiative to become leaders in their respective industries. Others have been forced to make additional adjustments under rationalization schemes proposed by the EU or the French Government. The depletion of natural resources and/or the cessation of subsidies for uneconomic operations have had impacts on local communities and their

economies. France will have the advantage of plentiful electrical power to attract industrial facilities requiring skilled work forces and will have good access to markets in Europe.

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### Major Sources of Information

- Bureau de Recherches Géologiques et Minières  
Avenue de Concyr - BP 6009  
45060 Orleans, cedex 2, France
- Ministere de l'Industrie  
DGEMP SMPSS  
101 Rue de Grenelle  
75353 Paris, France

TABLE 1  
FRANCE: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/ METALS	1994	1995	1996	1997	1998 e/
<b>Aluminum:</b>					
Bauxite, gross weight thousand tons	128	75	81	164 3/	165
<b>Alumina:</b>					
Crude do.	438	519	550	570 r/	570
Calcined do.	344	425	440	450 r/	450
<b>Metal:</b>					
Primary do.	438	372	386	399	424 4/
Secondary do.	228	231	236	242 r/	240
Antimony metal, including regulus	750	680	520	650 r/	600
Cadmium metal	6	--	205	309	223 4/
<b>Cobalt metal:</b>					
Powder	310	330	580	670 r/	600
Chloride	146	161	174	159	172
<b>Copper:</b>					
Mine output, Cu content	174	172	170 r/	196 r/	180
<b>Metal:</b>					
Blister, secondary e/	4,400	2,580	2,300	1,490 r/	2,000
<b>Refined:</b>					
Primary	16,600	4,200	10,500	5,800 e/	5,400
Secondary e/	25,200	38,240	28,600	29,800 r/	40,000
Total	41,800	42,440	39,100	35,600 r/	45,400
Gold, mine output, Au content kilograms	5,078	4,615	5,651	4,350 r/	5,600
<b>Iron and steel:</b>					
<b>Iron ore and concentrates:</b>					
Gross weight thousand tons	2,420	1,496	1,464	523 r/	300
Fe content do.	706	432	430	145 e/	150
<b>Metal:</b>					
Pig iron do.	13,293	12,860	12,108	13,424	13,603 4/
<b>Ferroalloys:</b>					
<b>Blast furnace, spiegeleisen and ferromanganese</b>					
<b>Electric furnace:</b>					
Ferromanganese thousand tons	66	85 r/	100 r/	100 r/	100
Ferrosilicon do.	112	108	103 r/	109 r/	110
Silicon metal do.	66	71	74	66 r/	65
Other (Si, Ca, Mg) do.	20	124	114	94 r/	95
Total	558	692 r/	672 r/	695 r/	691
Steel ingots and castings do.	18,028	18,096	17,630	19,773	20,241 4/
Semimanufactures do.	16,205	16,164	16,224 r/	17,975 r/	16,822 4/
<b>Lead:</b>					
Smelter, secondary e/	185,000	247,700	241,100	218,500 r/	200,000
<b>Refined:</b>					
Primary	105,346	128,708	140,750 e/	124,100 r/	131,000
Secondary	155,200	168,000 e/	162,000 e/	159,300 r/	158,000
Total	260,546	296,708 e/	302,750 r/ e/	283,400 r/	289,000
Magnesium metal, including secondary	12,280	14,450	14,000	13,740 r/	14,000
Nickel metal 5/	8,841	9,106	9,070	8,750	9,778 4/
<b>Silver: e/</b>					
Mine output, Ag content: kilograms	--	1,167 4/	1,550	1,770 r/	2,000
Mixed copper, gold, silver concentrates do.	640	--	--	--	--
Total do.	640	1,167 4/	1,550	1,770 r/	2,000
Metal, Ag content of final smelter products	921	666	650	535 r/	550
Tin, secondary do.	2,700 e/	3,020	4,410	3,810 r/	3,000
Tungsten, powder	600	600	670	680	600
<b>Uranium:</b>					
Mine output, U content	1,315	857	841	579 r/	500
Chemical concentrate, U <sub>3</sub> O <sub>8</sub> equivalent	1,245	728	713	487	475
<b>Zinc:</b>					
Mine output, Zn content	1,000 e/	--	--	--	--
Metal including secondary, slab	306,000 e/	300,400	324,300	317,151	329,019 4/
Zirconium, sponge	1,500	1,500	1,550	1,870	1,800

See footnotes at end of table.

TABLE 1--Continued  
FRANCE: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/	1994	1995	1996	1997	1998 e/	
<b>INDUSTRIAL MINERALS</b>						
Barite, BaSO <sub>3</sub> equivalent	72,100	75,450	76,000	77,000 r/	76,000	
Bromine, elemental e/	2,190	2,260	2,020	1,980 r/ e/	2,000 4/	
Cement, hydraulic	thousand tons	21,296	19,692	19,514	19,780 r/	19,500
Clays:						
Bentonite e/ 6/	5,000	--	--	--	--	
Kaolin and kaolinic clay (marketable)	thousand tons	327	345	326	332 r/	300
Refractory clay, unspecified	do.	8	15	14	13 r/	14
Diamonds, synthetic, industrial e/	thousand carats	3,600	3,800	3,500	3,600	3,600
Diatomite e/	thousand tons	90	80	80	80	80
Feldspar, crude e/	do.	390	632	546	621 r/	600
Fluorspar:						
Crude	do.	351	352	295	236	250
Marketable:						
Acid and ceramic-grade	do.	105	102	78	84 r/	80
Metallurgical-grade	do.	26	28	33	22 r/	30
Total	do.	131	130	111	106 r/	110
Gypsum and anhydrite, crude	do.	5,200	4,800	4,550	4,500 r/	4,500
Kyanite, andalusite, related materials e/	do.	60	80	70 r/	67 r/	70
Lime, quick and hydrated, dead-burned dolomite	do.	3,015	2,940	2,714	2,360 r/	2,400 e/
Mica e/	do.	10,000	10,000	10,000	8,000	10,000
Nitrogen, N content of ammonia	thousand tons	1,480	1,470	1,850	1,757 r/	1,570
Pigments, mineral, natural, iron oxide e/	do.	1,000	1,000	1,000	2,200 r/	2,000
Phosphates, Thomas slag	thousand tons	154	140	77	44 r/	50
Potash:						
Gross weight (run-of-mine)	do.	6,380	6,157	6,160	4,912 r/	5,000
K <sub>2</sub> O equivalent (run-of-mine) e/	do.	936	869	812	780 r/	700
K <sub>2</sub> O equivalent (marketable)	do.	870	799	760	725 r/	656 4/
Pozzolan and lapilli e/	do.	490	427	400	477 r/	460
Salt:						
Rock salt e/	do.	143 3/	165	160	371 r/	300
Brine salt (refined)	do.	1,658	1,491	1,460	1,475 r/	1,500
Marine salt	do.	1,123	1,473	970	1,188 r/	1,200
Salt in solution	do.	4,612	4,410	4,273	4,051 r/	4,000
Total	do.	7,536	7,539	6,863	7,085 r/	7,000
Sodium compounds: e/						
Soda ash	do.	1,123	1,120	1,106	1,053 r/	1,000
Sodium sulfate	do.	104	117	124	120 r/	120
Stone, sand and gravel:						
Limestone, agricultural and industrial e/	do.	6,410	9,780	9,200	11,433 r/	11,000
Slate, roof e/	do.	25	27	26	31 r/	30
Sand and gravel: e/						
Industrial sands, total	do.	7,240	6,100	6,550	6,560 r/	6,500
Other sand, gravel and aggregates	do.	353,600	174,900	158,650	164,000 r/	165,000
Sulfur, byproduct:						
Of natural gas	do.	865	825	755	697 r/	600
Of petroleum	do.	219	240	235	263 r/	245
Of unspecified sources	do.	100 e/	106	99	236 r/	261 4/
Total e/	do.	1,184	1,171	1,089	1,196 r/	1,106
Talc:						
Crude	do.	306,300	322,300	349,270	362,000 r/	360,000
Powder e/	do.	277,800	297,300	320,970	300,000	300,000
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Asphaltic material e/	do.	38,400	32,300	28,500	23,000 r/	24,000
Carbon black e/	do.	200,000	259,000	246,500	253,000 r/	250,000
Coal, including briquets:						
Anthracite and bituminous	thousand tons	8,040	7,014	7,312	5,779	5,300
Lignite	do.	1,500	1,402	939	690 r/	800
Total	do.	9,540	8,416	8,251	6,469 r/	6,100
Briquets	do.	336	276	256 r/	250 e/	250
Coke, metallurgical	do.	4,504	5,447	3,850	3,900 e/	4,000

See footnotes at end of table.

TABLE 1--Continued  
FRANCE: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/		1994	1995	1996	1997	1998 e/
MINERAL FUELS AND RELATED MATERIALS--Continued						
Gas, natural:						
Gross	million cubic meters	3,500	3,300	2,800	2,600 r/	2,600
Marketed	do.	3,610	2,830	2,815 r/	2,800 e/	2,600
Petroleum:						
Crude	thousand 42-gallon barrels	20,384	18,284	15,339	13,104	13,000
Refinery products: e/						
Liquefied petroleum gas	do.	28,861 4/	30,000	32,155 4/	34,324 4/	34,000
Gasoline, all kinds	do.	146,947 4/	148,000	141,524 4/	145,954 4/	145,000
Jet fuel	do.	46,965 4/	45,000	45,000	53,656 4/	54,000
Kerosene	do.	500	500	500	500	500
Distillate fuel oil	do.	200,000	200,000	200,000	200,000	200,000
Heavy fuel oil	do.	79,322 4/	78,000	78,000	76,000	76,000
Other products	do.	40,000	40,000	40,000	40,000	40,000
Refinery fuel and losses	do.	20,000	20,000	20,000	20,000	20,000
Total	do.	562,595	561,500	557,179 r/	570,434 r/	569,500

e/ Estimated. r/ Revised.

1/ Table includes data available through June 1999.

2/ In addition to the commodities listed, France also produces germanium from domestic ores and has been described as the world's leading producer of this commodity in French resources. Unfortunately, actual output is not regularly reported. In addition, France produces large amounts of stone, but statistics on output are not available.

3/ Reprocessed bauxite, not for metallurgical use.

4/ Reported figure.

5/ Excludes secondary production from nickel/cadmium batteries.

6/ Includes smectic clay.

TABLE 2  
FRANCE: STRUCTURE OF THE MINERAL INDUSTRY IN 1998

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of facilities	Annual capacity	
Alumina	Aluminium P�chiney	Plant at Gardanne, Bouches-du-Rhone Province	700	
Aluminum	do.	Aluminum smelters at: Saint-Jean-de-Maurienne, Savoie Province	120	
Do.	do.	Nogu�res, Pyr�n�es, Atlantiques Province	115	
Do.	do.	Lannemezan, Hautes-Pyr�n�es Province	63	
Do.	do.	Auzat, Ari�ge Province	44	
Andalusite	Denain-Anzin Min�raux Refractaire Ceramique (DAMREC)	Glomel Mine, Brittany	75	
Antimony, metal	Soci�t� Nouvelle des Mines de la Lucette	Plant at Le Genest, Mayeene Province	10	
Barite	Barytine de Chaillac	Mine and plant at Chaillac, Indre Province	150	
Do.	Soci�t� Industrielle du Centre	Mine at Rossigno, Indre Province	100	
Bauxite	Aluminium P�chiney	Mines in Var Province (closed--maintenance status)	900	
Do.	Soci�t� Anonyme des Bauxites et Alumines	do.	400	
Do.	de Province (S.A.B.A.P.)	do.	200	
Cadmium	tons	Compagnie Royal Asturienne des Mines	Plant at D'Auby-les-Douai, Nord Province	200
Cement		Eight companies, of which the largest are: LaFarge S.A. France	80 plants, including-- 15 plants; largest at St. Pierre-la-Cour	23,233 7,815 (1,160)
Do.		Soci�t� des Ciments Fran�ais	13 plants; largest at Gargenville	6,190 (1,100)
Coal		Charbonnages de France (CdF) including:	13,000	
Do.		Bassin de Paris	Mines and washeries in middle France	(2,500)
Do.		Bassin de Nord-Pas-de-Calais	Mines and washeries in northern France	(1,000)
Do.		Bassin de Lorraine	Mines and washeries in eastern France	(9,500)
Cobalt, metal	tons	Soci�t� Metallurgique Le Nickel (SLN)	Plant at Sandouville, near Le Havre	600
Copper, metal		Compagnie General d'Electrolyse du Palais	Electrolytic plant at Palais-sur-Vienne	45
Do.		Soci�t� Fran�aise d' Affinage du Cuivre	Smelter at Poissy	11
Do.		Affinerie Sud-Ouest	Refinery at Toulouse	2
Feldspar		Denain-Anzin Min�raux S.A.	Mine and plant at St. Ch�ly d' Apcher	55

TABLE 2--Continued  
FRANCE: STRUCTURE OF THE MINERAL INDUSTRY IN 1998

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of facilities	Annual capacity
Ferroalloys		Société du Ferromanganese de Paris, Outreau	Plant at Boulogne-sur-Mer	420
Do.		Péchiney Electrometallurgie	Plants at Bellegarde	387
Do.		Chromeuropa S.A.	Plant at Dunkerque	25
Fluorspar		Société Générale de Recherches et d'Exploitation Minière (SOGEREM)	Mines at Le Burc, Montroc le Moulina, and Trebas	150
Gold	kilograms	Société des Mines du Bourneix (Government)	Mines in the Saint Yrieix la Perche District, Limoges	4,000
Do.	do.	Mines d'Or de Salsigne (Eltin Co., 51%; Ranger Co., 18%; Peter Hambro Plc., 10%)	Mine near Carcassonne	3,000
Gypsum		S.A. de Materiel de Construction	Mine at Taverny	1,500
Iron and steel:				
Iron ore		Acieries Reunies de Burbach-Eich- Dudelang S.A. (ARBED)	Mine at Terres Rouges, Bassin de Lorraine, eastern France	8,000
Steel		Usinor-Sacillor	Dunkerque	7,500
Do.		do.	Fos-sur-Mer	4,200
Do.		do.	Seramange	3,000
Do.		Sollac, Unimetal (Usinor-Sacillor, 100%)	Gadrange, Neuves Maisons, Thonville, Trith-St-Leper	8,400
Kaolin		La Source Compagnie Minière	Kaolin d'Arvor Mine, Quessoy	300
Lead, metal		Métaleurop Nord S.A.	Imperial smelter, Noyelles-Godualt	110
Magnesium, metal		Société Française d'Electro-Metallurgique	Plant at Marignac, Haute Garonne	14
Natural gas	million cubic meters	Société Nationale Elf Aquitaine (SNEA)	Gasfield and plant at Lacq	20,000
Nickel, metal		Société Métallurgie le Nickel (SLN)	Plant at Sandouville	16
Petroleum:				
Crude	barrels per day	Société Nationale Elf Aquitaine (SNEA)	Paris Basin oilfields	1,000
Refined	do.	Compagnie Française de Raffinage (Total)	Refineries at Gonfreville and La Mede	446,000
Do.		Shell-Française	Refinery at Petite Couron	285,000
Do.		do.	Refinery at Berre	270,000
Do.		Elf Aquitaine-France	Refinery at Feyzin	120,000
Do.		do.	Refinery at Donges	200,000
Do.		do.	Refinery at Grandpuits	96,000
Do.		Société Française British Petroleum (S.F.B.P.)	Refineries at Lavera	175,000
Do.		Esso S.A.	Refineries at Fos-sur-Mer	237,000
Do.		Mobil Oil Française	Refineries at Gravenchon	62,000
Do.		Cie. Rhenane de Raffinage (CRR)	Refinery at Reichstett	80,000
Potash, K <sub>2</sub> O		Mines de Potasse d' Alsace S.A. (MDPA)	Mines at Amélie, Marie-Louise, and Theodore, in Alsace	10,000
Salt, rock		Compagnie des Salins du Midi et des Salines de l'Est	Varangeville Mine at Saint-Nicolas-de-Port	9,000
Sulfur		Société Nationale Elf Aquitaine (SNEA)	Byproduct from natural gas desulfurization, Lacq plant	3,000
Talc		Talcs de Luzenac S.A. (Rio Tinto Corp., 100%)	Trimons Mine near Ariège, Pyrenees	350,000
Uranium, U <sub>3</sub> O <sub>8</sub>	tons	Compagnie Générale des Matières Nucleaires (COGEMA) (Government)	Mines at Limousin, Vendee, and Hérault	1,800
Zinc, metal		Société des Mines et Fonderies de Zinc de la Vieille Montagne (VM)	Electrolytic plant, Auby-les-Douai	210